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# SPECIFIC FEATURES OF GEOLOGICAL STRUCTURE OF PLATFORM REGIONS IN THE SOVIET UNION IN RELATION TO THEIR OIL AND GAS POSSIBILITIES

M.F.Mirchik, A.A.Trofimuk, and K.R.Chepikov.

The main proved oil reserves discovered on the territory of the USSR are related to the Ancient Russian Platform and natural gas reserves are related to the Pre-Caucasus and Kara-Kum Hercynian Platforms. The Siberian Platform Regions are of great prospects.

It has been found that the formation of the platforms differs according to their ages beginning with the Lower Archean and ending with the Mesozoic.

The complex tectonic framework of the Platform and complexity of geotectonic transformations have been determined. The movements are of wave-oscillating nature. They are characterised by changes in time regimes due to the structural plans of various stratigraphic and structural floors do not coincide.

Oil - and gas-bearing zones are placed on the slopes of large arched rises. Platform swells are accumulating areas for oil and gas. Local structures [illegible] and wedging out of layers on the slopes of swells as well are oil trapping formations.

# PROGRESS OF GEOPHYSICAL METHODS OF PROSPECTING FOR OIL AND GAS IN THE USSR

by Y.N.Godin, M.K.Polshkov,
L.A.Ryabinkin, V.V.Fedynsky
and E.E.Fotiady

Geological structure of oil provinces has been explored by a wide complex of geophysical methods. Reconnaissance seismic profiles and soundings have been developed. The depth of the crystalline basement is determined by means of recording seismic composite reflections and by the telluric current method. Offshore exploration, notably with piezoelectric geophones, have also been developed. Geological structures are being prospected by the seismic reflection method and sometimes by gravity meters. The method of controlled directional reception of seismic waves is designed for exploring in complex seismogeological conditions.

# PROGRESS OF TURBODRILLING AND STUDYING NEW METHODS OF DRILLING WELLS IN THE USSR

by R.A.Ioannesyan, F.A.Trebin,
M.I.Gusman, A.P.Ostrovsky,
E.I.Tagiev, N.I.Titkov,
A.T.Shmarev, Y.A.Gelfgat,
A.A.Minin and V.D.Shashin

The paper deals with the following problems of turbodrilling techniques: new designs of turbodrills, based on special turbines; turbodrills for drilling with diamond bits; turbodrills with unloaded bearings; turbodrills with rotating body; theory of turbodrilling operating conditions; bits for turbodrilling; turbodrilling of extra-deep wells, and reactive turbodrilling of wells, 1-3 m in diameter.

The paper also deals with theoretical research, and experimental and industrial results achieved in developing new effective methods of drilling wells (electrical turbodrilling, face vibrator, formation of shafts by blasting small charges of explosive on the face etc.).

# DEVELOPMENT OF THE THEORY AND PRACTICE OF OIL AND GAS FIELD PRODUCTION IN THE USSR

by A.P.Krylov, F.A.Trebin, Y.P.Borisov, S.T.Kotetkov, A.N.Buchin, M.I.Maksimov, M.T.Abasov, M.F.Mirchink, V.N.Vasilevsky, V.N.Scholkachev, A.L.Kozlov and B.M.Minsky

The paper analyzes the new principles of acting on oil-containing strata, which greatly increase the efficiency of the method for preserving reservoir pressure, widely applied in the USSR in developing oil deposits, as well as the influence of a heterogeneous real reservoir on the process of operating the deposit.

Methods are also considered for greater efficiency of gas deposit development by carrying out a number of measures aimed at improved utilization of stratum energy.

# THEORETICAL PRINCIPLES OF HYDRAULIC FRACTURING OF OIL STRATA

by S.A.Christianovitch, Y.P.Zheltov,
G.I.Barenblatt, G.K.Maximovich

A study has been made of the effect of overburden, elastic and plastic properties of rocks and of the properties of fracturing liquids on the mechanism of formation of fissures in rocks. The causes are indicated, which reduce the pressure of fracturing as compared with overburden.

Using the methods of the theory of elasticity several problems have been Solved of formation of vertical and horizontal fissures in oil strata with penetrating and non-penetrating fluids.

# PRODUCTION OF LUBRICATING OILS AND PARAFFIN FROM SULFUROUS OILS THE USSR

by L.G.Zherdeva, A.A.Karaseva, E.V.Voznesenskaya, A.E.Altshuller, B.B.Krol, D.I.Orochko, V.S.Akimov, B.B.Mikhailov, A.V.Agafonov and A.V.Drushinina.

The paper deals with the problem of producing lubricating oils and paraffins from sulfurous oils in the eastern areas of the USSR. The following subjects are analyzed:

I.Peculiarities of the chemical composition of raw materials and lubricating oils; the physicochemical principles of the technology of producing oils of a wide and of paraffins from paraffinic high-resin sulfurous oils by means of selective solvents.

II.A new continuous process of adsorption refining of oil products in a moving layer of an adsorbent.

III.Using the methods of hydrogenation and carbamide deparaffination, aimed at obtaining lubricating oils from heavy distillates in the course of catalytic cracking.

# STUDYING THE NATURE OF ACTIVITY OF ALUMOSILICATE CATALYSTS

by K.V.Topchieva, M.A.Kalinina, L.I.Piguzova, A.V.Agafonov, G.M.Panchenkov, M.M.Karakin and Y.S.Mirsky

The paper analyses the problems of the double nature of acidity and activity of alumosilicates in hydrocarbon reactions. Attention is drawn to studying the structure of catalysts in the process of their genesis, using the methods of poisoning and isotopic exchange.

# PROCESSES OF CONTINUOUS THERMOCONTACT CONVERSION OF CRUDE OIL ON COKE

by B.K.Amerik, Y.A.Botnikov, K.P.Lavrovsky, A.I.Skoblo, A.S.Aliev, A.M.Brodsky, B.B.Kaminer, P.V.Ovsyannikov, M.I.Korneyev, V.P.Sukhanov and A.N.Rumyantsev.

The paper sums up the results of research and experimental work carried out in the USSR, dealing with continuous thermocontact conversion of crude oil.

The following material is given:

First section - continuous coking on granulated coke. Second section - a description of the kinetics and chemism of coking in a fluid bed. Third section - high-temperature contact conversion of gas benzene and heavy crude oil.

# SOME REGULARITIES OF POLYMERIZATION OF -OLEFINS ON COMPLEX METAL-ORGANIC AND OXIDE CATALYSTS

by A.V.Topchiev and P.A.Krenisel

Investigation into the reaction of polymerization of propylene in the presence of the catalytic system $TiCl_4$-$Al(i.C_4H_9)_3$ has enabled us to suggest some new vew-points on the mechanism of polymerization, based on the independence of the molecular weight of the polymer on the time of reaction, and on a number of other studies in this field.

Polymerization of isobutylene with the same catalytic system has resulted in obtaining polyisobutylene, recorded for the first time, which differs by its structure from the one previously synthesized with the aid of typical ionic catalysts. The polyisobutylene so produced was analyzed by the methods of non-stable sedimentation equilibrium and infrared spectrometry.

A study of the polymerization of ethylene, propylene and other -olefins with metal oxide catalysts, using some physico-chemical methods of investigation, notably thermographic ones, has permitted to advance some new propositions dealing with the nature of catalytic action, as well as with activation of chromium oxide and molybdenum

# CATALYTIC SYNTHESIS OF CYCLOPENTADIENE HYDROCARBONS

by N.I.Shuikin and T.I.Naryshkina

Cyclopentadiene and its nearest homologues are of very great interest due to their high reactivity. They may be used for manufacturing valuable synthetic resins, plastics, highly effective insecticides, etc.

The authors have developed new methods for the catalytic synthesis of these hydrocarbons by dehydrocyclization of alkadienes and by dehydrogenation of five-member ring cyclenes on an alumo-chromo-potassium oxide catalyst at 600° and reduced pressure. Both methods produce high yields.

# CATALYTIC DEHYDROCYCLIZATION OF PARAFFINIC HYDROCARBONS

by B.A.Kazansky and A.I.Liberman

Paraffinic hydrocarbons are dehydrocyclized in the presence of platinum catalysts, producing cyclopentanic hydrocarbons along with aromatic ones. The yields of cyclopentanes are always higher than those of aromatic hydrocarbons.

The structure of the cyclopentanes so obtained indicates that the reaction proceeds without any preliminary isomerization of the carbon chain, n-Propyl- and isobutylbenzenes react similarly, yielding indanes.

# SYNTHESIS OF HIGHER ALIPHATIC ALCOHOLS BY THE METHOD OF DIRECT OXIDATION OF PARAFFINIC HYDROCARBONS

by A.N.Bashkirov and V.V.Kamzolkin

Investigations in the field of liquid phase oxidation of paraffinic hydrocarbons have led to the development of a directed process aimed at obtaining higher aliphatic alcohols. The directivity of the process is provided for by the presence of boric acid in the reaction zone and by selecting conditions for carrying out the reaction. Oxidation of hydrocarbons at reduced partial pressure of oxygen has made it possible to effect a maximum useful esterification of the alcohols formed in the initial stage and to develop a technology for their production.

The industrial yield of alcohols (from $C_{11}$ to $C_{27}$ and higher) exceeds 70 per cent. Secondary alcohols are mostly formed in this process, which have the same carbon skeleton and the number of carbon atoms in a molecule as the initial hydrocarbon. The alcohols so obtained have found wide application in various industries.

# HALOGENATION OF LOW MOLECULAR ALKANES IN A FLUID BED OF A CATALYST

by Y.G.Mamedaliev and
M.M.Huseinov

A systematic study has been made of bromination and chlorination reactions of low molecular alkanes in a fluid bed of a catalyst within the wide range of changes in process parameters; and conditions have been found which make it possible to obtain quantitative yields of halogenated alkanes. When a fluid bed is used, the chain reaction of halogenation is inhibited and its burst effect is stopped, which is due to the collision of radicals and atoms with a molecule of the powder-like catalyst; this is generally observed during an excess of halide in the reacting mixture.

The production of tetrachlormethane by dry natural gas chlorination is of particular interest. The yield of tetrachlormethane per converted chlorine reaches 90-95% of the theoretical figure at a temperature of 380-400°C with $Cl_2 : CH_4 = 4 : 1$, in a fluid bed of fine-dispersed catalyst.

# STUDYING THE CHEMICAL COMPOSITION OF BENZINES CONTAINING UNSATURATED HYDROCARBONS

by A.V.Topchiev, I.A.Musayev,
E.Kh.Iskhakova, A.N.Kislinsky
and G.D.Halpern

A complex method is presented for separating benzines obtained in secondary processing of oil into hydrocarbon groups: saturated (hexahydroaromatic, and a mixture of alkanes and cyclopentanes); unsaturated (cyclohexene, and a mixture of alkenes and cyclopentenes); aromatic.

A description is given of the hydrocarbon groups, their composition and connection between the latter and the chemical nature of the initial crude oils.

# ANALYSIS OF CRUDE OILS IN THE VOLGA-URAL REGION

by S.N.Pavlova and
Z.V.Driatskaya

The paper outlines the methods for analysing crude oils and straight-run products, aimed at obtaining technological data required for the selection of the best variants in processing crude oils.

Material is presented on investigating the crude oils in the Volga-Ural region, a most promising oil area.

# SYNTHETIC ADDITIVES FOR LUBRICATING OILS.

## INFLUENCE OF ADDITIVE STRUCTURE ON THEIR ACTIVITY

by P.I.Sanin, V.V.Sher and A.M.Kuliev

A number of phosphore-organic compounds have been obtained, the majority of which are of the metal dialkyldithiophosphate type. An investigation into the properties of these compounds has made it possible to establish directly the relationships between their structure and activity as additives for lubricating oils. The solubility of various types of additives in hydrocarbon solvents has been studied, and the effect of their structure on their detergent, anti-corrosive and de-emulsifying properties has been demonstrated. A special examination has been made of the structure of additives as active depressants.

A study has been made of sulphonate-type additives. The activity of sulphonates has been determined, depending on their structure, and their influence on the properties of lubricants of various chemical composition has been investigated.

# INVESTIGATION OF MOTOR OILS STABILITY AND METHODS OF ITS EVALUATION

by K.K.Papok, N.G.Puchkov,
S.E.Krein, E.G.Semenido
and V.N.Panov

The paper describes the new methods which make it possible to appraise the operational properties of motor oils such as detergent, antioxidant, lacquer- and sludge-forming, and volatility.

It has been found that the results of the new laboratory methods agree with those obtained by engine tests.

The paper shows the effect of chemical and fractional composition upon motor oil stability, the effect of sulfur compounds upon oil stability, the response of various oil fractions to the additives and the ways to increase oil stability.

# [illegible] REACTION [illegible] IN [illegible] PROCESSES

by A.M.[illegible]novsky and [illegible]

A general theory is outlined of continuous chemical processes for flow reactors with internal back mixing. The greater effect obtained by sectionalizing flow reactors for homogeneous processes can also be reached for heterogenous processes, namely for fluidized beds. Various methods of sectionalizing are systematized; parallel, successive, with multiple point introduction of reactans, and with multi-stage countercurrent. Charts and equations of sectionalized reactor efficiency are given.

# THEORY OF COMPLEX RECIRCULATION PROCESSES OF PETROCHEMICAL SYNTHESIS

by M.F.Kagiev

A theory of recirculation processes is outlined, applicable to a general case of combining processes in a single system with a limited or unlimited composition of feed. The theory allows to determine the general and component reactor feed, and the material balance of complex processes.

Equations for all possible variants are given, and the method for selecting the optimum scheme is substantiated.

An example is given for selecting the most effective variant for processing a petrochemical feed.

# HIGHER AND SECONDARY PETROLEUM EDUCATION IN THE SOVIET UNION

by M.F.Shigabutdinov, I.M.[illegible],
G.M.Sukharev and S.D.Sajgin

The system of training specialists for the oil industry in the USSR; specialized higher educational petroleum institutions, petroleum departments at Polytechnical institutes; petroleum specialities at chemical and geological departments of universities; evening engineering courses for training oilfields and refineries personnel; correspondence courses; specialities, curricula and educational methods.

Training specialists at petroleum specialized secondary schools.

The principles of assigning young specialists and their employment after graduation.

# USING THE METHODS OF ATOMIC PHYSICS IN OIL PROSPECTING AND PRODUCTION

by G.N.Flerov, F.A.Alexeyev,
V.N.Dakhnov, Y.A.Gulin and
Y.S.Shimelevich

The paper deals with the results of the investigation conducted in recent years, which have led to the development of new neutron methods of well testing (methods of inductive activity, spectrometry of gamma-radiation, neutron-neutron logging on epithermal neutrons), and which have allowed to solve successfully many problems of oilfield geology.

Problems are discussed concerning the use of tritium to control the movement of underground water in oilfield development.

The results of the investigations are illustrated by examples from commercial use.

# STUDYING THE RADIATION CHEMISTRY OF PETROLEUM HYDROCARBONS AND THE APPLICATION OF NUCLEAR RADIATION IN THE OIL PROCESSING INDUSTRY AND IN OIL-CHEMICAL SYNTHESIS

by A.V.Topchiev, N.P.Lavrovsky,
A.V.Prodsky, Y.A.Kolbanovsky,
L.S.Polak and others.

The paper deals with the following subjects:

1. Radiolysis of pure hydrocarbons and of hydrocarbons with sulfurous compounds under the influence of various nuclear radiations under different thermodynamic conditions.

2. Stability of hydrocarbons under the influence of radiation.

3. Radiation chlorination of alkanes.

4. Mechanism of radiation-chemical reactions of hydrocarbons.